

WHAT IS CLAIMED IS:

1. A fracture repair system for engagement with a bone having a condylar portion and a shaft portion, the system comprising:

5 a plate including a head portion and a body portion, the head portion having an internal wall defining a head hole therethrough and adapted for cooperation with the condylar portion, the body portion having an internal wall defining a body hole therethrough;

10 a bushing including a generally spherical exterior surface adapted for cooperation with the head hole and an opposed interior surface defining a passageway therethrough, the exterior surface of said bushing and the head hole of said plate being configured to permit polyaxial rotation of said bushing within the head hole;

15 a head attachment component including a distal portion sized for clearance passage through the passageway and into the bone and an opposed proximate portion sized to urge said bushing against the internal wall of said plate to form a friction lock between said bushing and said plate in a selected polyaxial position, said head attachment component being positionable in an orientation extending divergently from said plate; and

a body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion sized to cooperate with said plate.

20 2. A fracture repair system as in claim 1, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

3. A fracture repair system as in claim 1:

25 wherein the body portion of said plate further defines a second body hole through the body portion; and

further comprising a second body attachment component including a stem portion for passage through the second body hole and into the bone and an opposed cap portion sized to cooperate with said plate.

4. A fracture repair system as in claim 3:

wherein the cap portion of said first mentioned body attachment component is fixedly securable to said plate; and

wherein the cap portion of said second body attachment component is moveably securable to said plate.

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5. A fracture repair system as in claim 4, wherein the body portion of said plate adjacent the first mentioned body hole defines a first location featured for cooperating with a drill jig for guiding the attachment components and the body portion of said plate adjacent the second body hole defines a second location featured for cooperating with the drill jig, the first location feature and the second location feature being substantially identical.

10 6. A fracture repair system as in claim 1:

wherein said attachment component comprises first external threads on the proximate portion thereof and second external threads on the distal portion thereof, and

15 wherein the radially interior surface of said bushing comprises first internal threads thereon, said first internal threads of said bushing engageable with said first internal threads of said attachment component.

20 7. A fracture repair system for engagement with a bone having a condylar portion and a shaft portion, the system comprising:

a plate including a head portion and a body portion, the body portion having an internal wall defining a first body hole and a spaced apart second body hole therethrough;

25 a rigid body attachment component including a stem portion for passage through the first body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate; and

a movable body attachment component including a stem portion for passage through the second body hole and into the bone and an opposed cap portion adapted to movably cooperate with said plate.

8. A fracture repair system as in claim 7, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

9. A fracture repair system as in claim 7:

5 wherein the stem portion of said first mentioned rigid body attachment component is sized to be in clearance with the body hole; and

10 further comprising a second rigid body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate, the stem portion of said second rigid body attachment component being threadably cooperable with said plate.

10. A fracture repair system as in claim 7:

wherein the head portion of said plate has an internal wall defining a head hole therethrough and adapted for cooperation with the condylar portion;

15 further comprising a bushing including a generally spherical exterior surface adapted for cooperation with the head hole and an opposed interior surface defining a passageway therethrough, the exterior surface of said bushing and the head hole of said plate being configured to permit polyaxial rotation of said bushing within the head hole; and

20 further comprising a head attachment component including a distal portion sized for clearance passage through the passageway and into the bone and an opposed proximate portion sized to urge said bushing against the internal wall of said plate to form a friction lock between said bushing and said plate in a selected polyaxial position, said head attachment component being positionable in an orientation extending divergently from said plate.

25 11. A fracture repair system as in claim 7, wherein the body portion of said plate adjacent the first mentioned body hole defines a first location featured for cooperating with a drill jig for guiding the attachment components and the body portion of said plate adjacent the second body hole defines a second location featured for cooperating with the drill jig, the first location feature and the second location feature being substantially identical .

12. A fracture repair system for engagement with a bone having a condylar portion and a shaft portion, the system comprising:

a plate including a head portion and a body portion, the body portion having an internal wall defining a body hole therethrough;

5 a first rigid body attachment component including a stem portion for clearance passage through the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate; and

10 a second rigid body attachment component including a stem portion for threadable engagement with the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate.

13. A fracture repair system as in claim 12:

wherein the body portion of said plate further defines a second body hole therethrough ; and

15 further comprising a movable body attachment component including a stem portion for passage through the second body hole and into the bone and an opposed cap portion adapted to movably cooperate with said plate.

14. A fracture repair system as in claim 13, wherein the body portion of said plate adjacent the first mentioned body hole defines a first location featured for cooperating with a drill jig for guiding the attachment components and the body portion of said plate adjacent the second body hole defines a second location featured for cooperating with the drill jig, the first location feature and the second location feature being substantially identical.

25 15. A fracture repair system as in claim 12, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

16. A fracture repair system as in claim 12:

wherein the head portion of said plate has an internal wall defining a head hole therethrough and adapted for cooperation with the condylar portion;

5 further comprising a bushing including a generally spherical exterior surface adapted for cooperation with the head hole and an opposed interior surface defining a passageway therethrough, the exterior surface of said bushing and the head hole of said plate being configured to permit polyaxial rotation of said bushing within the head hole; and

10 further comprising a head attachment component including a distal portion sized for clearance passage through the passageway and into the bone and an opposed proximate portion sized to urge said bushing against the internal wall of said plate to form a friction lock between said bushing and said plate in a selected polyaxial position, said head attachment component being positionable in an orientation extending divergently from said plate.

17. A fracture repair system for engagement with a bone, the system comprising:

15 a plate including a portion having an internal wall defining a first body hole and a spaced apart second body hole therethrough;

a rigid body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate; and

20 a movable body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion adapted to movably cooperate with said plate.

18. A fracture repair system as in claim 17, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

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19. A fracture repair system as in claim 17:

wherein the stem portion of said first mentioned rigid body attachment component is sized to be in clearance with the body hole; and

further comprising a second rigid body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate, the stem portion of said second rigid body attachment component threadably cooperates with said plate.

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20. A fracture repair system as in claim 17:

wherein said plate defines a third hole therethrough;

further comprising a bushing including a generally spherical exterior surface adapted for cooperation with the third hole and an opposed interior surface defining a passageway therethrough, the exterior surface of said bushing and the third hole of said plate being configured to permit polyaxial rotation of said bushing within the third hole; and

10 further comprising a head attachment component including a distal portion sized for clearance passage through the passageway and into the bone and an opposed proximate portion sized to urge said bushing against the internal wall of said plate to form a friction lock between
15 said bushing and said plate in a selected polyaxial position, said head attachment component being positionable in an orientation extending divergently from said plate.

21. A fracture repair system as in claim 17, wherein said plate adjacent the first body hole defines a first location featured for cooperating with a drill jig for guiding the attachment
20 components and said plate adjacent the second body hole defines a second location feature for cooperating with the drill jig, the first location feature and the second location feature being substantially identical.

22. A joint fracture system for use with joint having adjoining first and second long
25 bones, said system comprising:

a first plate for cooperation with the first long bone, the first plate including a first plate head portion and a first plate body portion, the first plate body portion having an internal wall defining a first plate first body hole and a spaced apart first plate second body hole therethrough;

a first plate rigid body attachment component including a stem portion for passage through the first plate first body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said first plate;

5 a first plate movable body attachment component including a stem portion for passage through the first plate first body hole and into the bone and an opposed cap portion adapted to movably cooperate with said first plate;

10 a second plate for cooperation with the second long bone, the second plate including a second plate head portion and a second plate body portion, the second plate body portion having an internal wall defining a second plate first body hole and a spaced apart second plate second body hole therethrough;

a second plate rigid body attachment component including a stem portion for passage through the second plate first body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said second plate; and

15 a second plate movable body attachment component including a stem portion for passage through the second plate second body hole and into the bone and an opposed cap portion adapted to movably cooperate with said second plate.

23. A joint fracture repair system as in claim 22, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

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24. A joint fracture repair system as in claim 22:

wherein a portion of at least one of the stem portion of said rigid body attachment components for passage through the body hole is sized to be in clearance with the body hole; and

25 further comprising an additional rigid body attachment component including a stem portion for passage through the body hole and into the bone and an opposed cap portion adapted to rigidly cooperate with said plate, the stem portion of said second rigid body attachment component threadably cooperates with said plate.

25. A fracture repair system as in claim 22:

wherein the head portion of at least one of said plates has an internal wall defining a head hole therethrough and adapted for cooperation with the condylar portion;

5 further comprising a bushing including a generally spherical exterior surface adapted for cooperation with the head hole and an opposed interior surface defining a passageway therethrough, the exterior surface of said bushing and the head hole of said plate being configured to permit polyaxial rotation of said bushing within the head hole; and

10 further comprising a head attachment component including a distal portion sized for clearance passage through the passageway and into the bone and an opposed proximate portion sized to urge said bushing against the internal wall of said plate to form a friction lock between said bushing and at least one of said plates in a selected polyaxial position, said head attachment component being positionable in an orientation extending divergently from at least one of said plates.

26. A fracture repair system as in claim 22, wherein at least one the body portion of said first plate and the body portion of said second plate defines a plate hole therethrough opposed to the head portion, the plate hole adapted for cooperation with one of said first plate rigid body attachment component and said second plate rigid plate attachment to provide rigid attachment of said plate to said component to avoid movement of said plate with respect to the bone as the joint is moved.

20 27. A fracture repair system as in claim 22, wherein at least one the body portion of said first plate and the body portion of said second plate defines a end thereof opposed to the head portion, the end having a tapered shape to assist in percutaneous insertion of the plate into an implanting position adjacent one of the long bones.

25 28. A method for repairing a bone fracture on a bone having a condylar portion and a shaft portion, the method including the steps of:

providing a locking plate apparatus including moveable body attachment component, a fixed body attachment component and a plate having a head portion and a body portion and at

least two plate holes through the body portion, the first plate hole for rigid attachment to the plate and the second plate hole for moveable attachment to the plate;

determining which of a locking plate and a non-locking plate bone is to be used;

selecting the fixed body attachment component if the locking plate is to be used and

5 selecting the moveable body attachment component if the non-locking plate is to be used;

inserting the fixed body attachment component into the first plate hole if the locking plate is to be used and inserting the moveable body attachment component into the second plate hole if the non-locking plate is to be used; and

securing the fixed body attachment component if the locking plate is to be used and

10 securing the moveable body attachment component if the non-locking plate is to be used..

29. The method of claim 28, wherein the step of determining which of a locking plate and a non-locking plate is used is based on determining which of an osteoporotic bone and a non-osteoporotic bone is to be repaired, the locking plate to be used if the bone is osteoporotic and the 15 non-locking plate to be used if the bone is non-osteoporotic.

30. A fracture repair system for engagement with a bone having a condylar portion and a shaft portion, the system comprising:

a plate including a head portion and a body portion, the head portion having an internal 20 wall defining a head hole therethrough and adapted for cooperation with the condylar portion, the body portion having an internal wall defining a body hole therethrough; and

an attachment component including a distal portion sized for passage through at least one of the head hole and the body hole and into the bone and an opposed proximate portion sized to rigidly secure to the internal wall of one of the head hole and the body hole, the distal portion 25 being generally cylindrical and having a smooth periphery.

31. A fracture repair system as in claim 30, wherein said plate defines a surface thereof, the surface closely conforming to the bone.

32. A fracture repair system as in claim 30, further comprising a second attachment component including a distal portion sized for passage through the other of the head hole and the body hole and into the bone and an opposed proximate portion sized to rigidly secure to the internal wall of the other of the head hole and the body hole, the distal portion being generally cylindrical and having a smooth periphery.

33. A fracture repair system as in claim 30, further comprising a second attachment component having first external threads on the proximate portion thereof and second external threads on the distal portion thereof.